between controllers in an air traffic control station. The system may be configured to define a first sector configuration of at least two adjacent sectors in an airspace, each sector being assigned to a station controller for managing movement of one or more aircraft in the respective sector, and a communication channel different from any other sector. The system may be configured to for monitor for each sector, an anticipated level of air traffic controller workload over a selected time interval. The system may detect a difference greater than a pre-selected threshold in anticipated levels of air traffic control workload between the two adjacent sectors over the selected time interval. The system may then redefine the first sector configuration into a second sector configuration of the two adjacent sectors such that the difference in anticipated air traffic controller workload in the two adjacent sectors is below the threshold. The system then implements the second sector configuration.

In other examples, a method of balancing air traffic controller work load includes defining multiple sectors in an airspace. A controller is assigned to each sector to manage movement of one or more aircraft in the respective sector. The method includes detecting an imbalance in levels of anticipated air traffic controller workload relative to two or more sectors over a selected time interval. The method includes rebalancing the levels of anticipated air traffic workload for the two or more sectors by redefining the sectors. A change of communication channels is communicated to an aircraft that switches sectors due to the rebalancing.

Features, functions, and advantages may be achieved independently in various examples of the present disclosure, or may be combined in yet other examples, further details of which can be seen with reference to the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic diagram of an illustrative airspace management system for managing airspace sectors in accordance with aspects of the present disclosure.

Fig. 2A is a schematic diagram of an unbalanced workload on controllers before resectorization of the airspace sectors of Fig. 1.

Fig. 2B is a schematic diagram of a balanced workload on controllers after resectorization of the airspace sectors of Fig. 1.

Fig. 3 is a schematic diagram of an illustrative resectorization system.

Fig. 4 is a flowchart depicting steps in a resectorization process.

WHAT IS CLAIMED IS:

1. A method of controlling air traffic in an airspace, comprising:

defining a first sector configuration of at least two adjacent sectors in the airspace, each sector being assigned to a station controller in an air traffic control station to manage movement of one or more aircraft in the respective sector, and a communication channel specific to the sector,

for each sector, monitoring an anticipated level of air traffic controller workload over a selected time interval,

detecting a difference greater than a pre-selected threshold in anticipated levels of air traffic controller workload in the two adjacent sectors over the selected time interval,

redefining the first sector configuration into a second sector configuration of the two adjacent sectors such that the difference in controller workload in the two adjacent sectors is below the threshold, and

implementing the second sector configuration.

2. The method of claim 1, wherein the one or more aircraft include inbound flights to an airport.

3. The method of claims 1 or 2, wherein the one or more aircraft include outbound flights from an airport.

4. The method of any of claims 1-3, wherein the defining step includes defining multiple sectors surrounding an air traffic control station.

5. The method of any of claims 1-4, wherein the redefining step includes redefining all of the sectors simultaneously such that no two adjacent sectors have anticipated air traffic controller workload differing more than the threshold.

6. The method of any of claims 1-5, wherein the selected time interval is between one minute and one hour.

7. The method of any of claims 1-6, further comprising:

obtaining acceptance of the second sector configuration from the station controllers before the implementing step.

8. The method of any of claims 1-7, wherein the redefining step includes altering a common boundary between the two adjacent sectors.

9. The method of any of claims 1-8, further comprising:

reassigning a new communication frequency to all aircraft that move from one sector to another sector due to the implementing step.

10. The method of any of claims 1-9, wherein the anticipated level of air traffic controller workload includes management of unmanned aircraft.

11. The method of any of claims 1-10, wherein the anticipated level of air traffic controller workload includes management of manned aircraft.

12. The method of any of claims 1-11, wherein each station controller is a person.

13. The method of any of claims 1-12, wherein each station controller includes a processor programmed to manage control of air traffic in the respective sector.

14. The method of any of claims 1-13, wherein the pre-selected threshold is at least 5%.

15. A system for managing air traffic in an airspace, comprising:

a processor configured to balance levels of anticipated air traffic controller workload between controllers in an air traffic control station, the processor being programmed to:

define a first sector configuration of at least two adjacent sectors in an airspace, each sector being assigned to a station controller for assigned to managing movement of one or more aircraft in the respective sector, and a communication channel different from any other sector,

for each sector, monitor an anticipated level of air traffic controller workload over a selected time interval,

detect a difference greater than a pre-selected threshold in anticipated levels of air traffic control workload between the two adjacent sectors over the selected time interval,

redefine the first sector configuration into a second sector configuration of the two adjacent sectors such that the difference in anticipated air traffic controller workload in the two adjacent sectors is below the threshold, and

implement the second sector configuration.

16. The system of claim 15, wherein the redefining step includes altering a common boundary between at least two adjacent sectors.

17. The system of claims 15 or 16, wherein the processor is further programmed to communicate a change of communication channel to each aircraft that switches sectors due to the redefining and implementing steps.

18. A method of balancing air traffic controller work load, comprising:

defining multiple sectors in an airspace,

for each sector, assigning a controller to manage movement of one or more aircraft in the respective sector,

detecting an imbalance in levels of anticipated air traffic controller workload in two or more sectors over a selected time interval,

rebalancing the levels of anticipated air traffic workload in the two or more sectors by redefining the sectors, and

communicating a change of communication channels to an aircraft that switches sectors due to the rebalancing.

19. The method of claim 18, wherein the rebalancing step includes altering a common boundary between at least two adjacent sectors.